

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

6161 0040.05

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on _____

Signature _____

Typed or printed name _____

Application Number

10/664,157

Filed

09/17/2003

First Named Inventor

Yong-Tae KIM

Art Unit

1745

Examiner

CHU, Helen OK

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐

applicant/inventor.

☐

assignee of record of the entire interest.

See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☒

attorney or agent of record.

Registration number 50,114

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attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 _____

Hae-Chan Park

Signature

Hae-Chan Park

Typed or printed name

703-288-5105

Telephone number

June 18, 2007

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

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*Total of _____ forms are submitted.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Docket No.: 61610070US

Yong-Tae KIM

Serial No.: 10/664,157

Group Art Unit: 1745

Confirmation No.: 4172

Filed: September 17, 2003

Examiner: Helen CHU

For: **NEGATIVE ELECTRODE FOR LITHIUM BATTERY AND LITHIUM BATTERY
COMPRISING THE SAME**

Mail Stop: AF

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

In response to the Final Office Action mailed March 16, 2007 ("Office Action") and the Advisory Action mailed June 12, 2007 ("Advisory Action"), Applicants respectfully request review of the above referenced application prior to the filing of an appeal brief because the rejections of record are clearly not proper and are without basis. Specifically, as noted below, Applicants submit that the Office Action fails to establish a *prima facie* case of obviousness for independent claims 1 and 24, as well as the claims that depend therefrom.

I. Applicants submit that the Office Action fails to establish a *prima facie* case of obviousness of all claims at least because the combined references fail to disclose all of the claimed features.

Claims 1-7, 9-17, and 19-24 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 5,961,672 issued to Skotheim, *et al.* ("Skotheim") in view of U. S. Patent No. 6,245,458 issued to Sotomura ("Sotomura").

The combined references fail to disclose an organosulfur compound in a negative electrode for a lithium battery, as required by claims 1 and 24. Skotheim discloses a secondary battery including a composite lithium anode and a thin film of lithium ion-conductive polymer interposed between the lithium metal and the electrolyte. However, Skotheim fails to disclose a protective layer including an organosulfur compound and an ionic conductive polymer.

The Examiner relies on Sotomura to cure this deficiency in Skotheim. Sotomura teaches an electrode composite including an organosulfur compound and a polymer electrolyte (see column 4, line, 15 and column 5, lines 43-58). However, this electrode composite does not include a lithium metal layer and is used as the cathode electrode, not as the anode electrode (see column 1, lines 10-11 and column 5, line 66-column 6, line 2).

Therefore, Sotomura does not teach an organosulfur protective layer in a metallic lithium anode, as the Examiner asserts on page 3 of the Office Action. Rather, as stated by the Examiner on page 8 of the Office Action, "The Sotomura et al. reference uses a composite electrode with an organic disulfide fro [sic] a battery which provides high voltage when used with a lithium anode." This statement makes it clear that the organic disulfide is not a part of the metallic lithium anode, but rather is a part of the composite electrode.

In the Advisory Action, the Examiner argues that the organo-sulfur containing composite electrode of Sotomura is doped with lithium ions. However, lithium ions do not constitute a lithium metal layer. As such, the composite electrode of Sotomura does not disclose organosulfur protective layer in a metallic lithium anode and therefore, fails to cure the deficiency of Skotheim.

The Examiner further contends, in both the Office Action and the Advisory Action, that an anode and a cathode become interchangeable in a secondary battery. However, the Examiner applies this assertion incorrectly. Skotheim and Sotomura describe the initial anode and the initial cathode. When the battery is charged or discharged, the charges of the

electrodes may change. However, the materials of the electrodes do not change. In both Skotheim and Sotomura, the electrode that is initially negatively charged is referred to as the anode and includes a lithium metal layer, and the electrode that is initially positively charged is referred to as the cathode and does not contain a lithium metal layer. Neither reference discloses the inclusion of an organosulfur compound and an ionic conductive polymer in an electrode comprising a lithium metal layer, as required by independent claims 1 and 24.

II. Applicants further submit that one of ordinary skill in the art would have had no reason to combine the references in the manner asserted by the Examiner.

One of ordinary skill in the art faced with the problem presented in Skotheim would not look to the teaching of Sotomura because the references address completely different problems. Skotheim is directed at providing a lithium metal anode that has been stabilized against dendrite formation, whereas Sotomura is directed at providing a cathode electrode composition containing an organic sulfide compound.

In the Advisory Action, the Examiner asserts that "the Sotomura reference teaches an organo-sulfur composite electrode capable of being doped electrically with lithium ions and teaches that the composite layer exhibits high energy density and gives a high charging and discharging efficiency and good charging and discharging cycle life which provides motivation to combine the organosulfur composite into the anode as taught by Skotheim."

However, this statement fails to provide a reason why one of ordinary skill would combine a teaching regarding a cathode electrode, which does not include a lithium metal layer, and a teaching regarding an anode electrode, which does include a lithium metal layer, into a single electrode. It is again noted that an electrode doped with lithium ions does not include a lithium metal layer.

III. Applicants also submit that even if one of ordinary skill in the art were to combine the teachings of Skotheim and Sotomura, one would not arrive at the claimed invention.

If one of ordinary skill in the art were to combine the teachings of Skotheim, which is directed to a lithium metal anode, and Sotomura, which is directed to composite cathode electrode, the result would be a lithium battery having the anode of Skotheim and the cathode of Sotomura rather than a single electrode as suggested by the Examiner.

IV. Applicants submit that Zuiho fails to cure the deficiencies of Skotheim and Sotomura.

Claims 8 and 18 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Skotheim in view of Sotomura, in further view of Japanese Publication No. 10-101793 to Zuiho, *et al.* Applicants respectfully submit that claim 1 is allowable over Skotheim and Sotomura, and Zuiho fails to cure the deficiencies of Skotheim and Sotomura noted above with regard to claim 1. Hence, claims 8 and 18 are allowable at least because they depend from an allowable claim 1.

V. Applicants submit that Chu and Fauteux fail to cure the deficiencies of Skotheim and Sotomura.

Claims 24 and 25 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Skotheim in view of Sotomura, in further view of U.S. Patent 5,523,179 issued to Chu ("Chu") and U.S. Patent 6,030,719 issued to Fauteux *et al.* ("Fauteux").

Chu discloses an active-sulfur material in a positive electrode, but provides no such teaching regarding a negative electrode. In the Office Action, the Examiner cited Fauteux for the teaching that an anode and cathode become interchangeable with each other depending on

whether the cell is charging or discharging. However, the Examiner once again applied this teaching incorrectly.

Even if the negative electrode of Chu, which comprises a lithium metal layer, becomes the positive electrode, and the positive electrode of Chu, which comprises the active-sulfur material, becomes the negative electrode, one does not arrive at the claimed invention. Rather, in this scenario, the negative electrode comprises an active-sulfur material, but not a lithium metal layer. Therefore, none of the references teach an electrode including both an organosulfur material and a lithium metal layer, as required by independent claim 24.

VI. Applicants respectfully submit that the rejections of record discussed above are clearly not proper and are without basis and that all grounds for rejection have been overcome or rendered moot. Accordingly, Applicants submit that all pending claims are allowable and that the application is in condition for allowance. Prompt and favorable consideration of this Pre-Appeal Brief Request for Review is respectfully requested.

Respectfully Submitted,

/hae-chan park/

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Reg. No. 50,114

Date: June 18, 2007 .

Customer No. 58027

HCP/SLK/tmk